

# DEPARTMENT OF ENVIRONMENTAL CONSERVATION

## AIR QUALITY CONTROL CONSTRUCTION PERMIT

**Permit No.: 074CP03**

**Proposed: December 2, 2004**

The Department of Environmental Conservation (Department), under the authority of AS 46.03, AS 46.14, AS 46.40, 6 AAC 50, 18 AAC 15, and 18 AAC 50.315, issues an Air Quality Control Construction Permit to the Permittee listed below.

**Operator and Permittee:** **Alyeska Pipeline Service Company**

900 E. Benson Blvd.  
Anchorage, AK 99508

**Owner:** Owners of the Trans-Alaska Pipeline System

**Stationary Source:** **Trans-Alaska Pipeline System Pump Station 3**

**Location:** Latitude: 68° 50' 36" North; Longitude 148° 49' 40" West

**Physical Address:** Sections 8, 9, 16 and 17, T7S, R14E Umiat Meridian

**Permit Contact:** Don Mark Anthony (907) 450-7652

The Department authorizes the Permittee to install two turbines, two reciprocating internal combustion engines, and two boilers at Pump Station 3, as part of the **Strategic Reconfiguration Project**.

This permit satisfies the obligation of the Permittee to obtain a construction permit as set out in AS 46.14.130. As required by AS 46.14.120, APSC shall comply with the terms and conditions of this construction permit.

This stationary source is classified under 18 AAC 50.300(b)(2) and 18 AAC 50.300(c)(1). The project is a modification classified under 18 AAC 50.300(h)(2).

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John F. Kuterbach, Manager  
Air Permits Program

## Table of Contents

Section 1	Permit Terms and Conditions .....	4
	Emission Unit Inventory and Description .....	4
	Ambient Air Quality Protection Requirements .....	6
	Owner Requested Limits to Avoid Project Classification as a PSD Major Modification.....	7
	Title V Permit Administrative Revisions .....	10
	Federal Emissions Standards - Siemens Cyclone Emission Units 18 and 19.....	11
	State Emission Standards.....	12
Section 2	Permit Documentation .....	12

## Abbreviations/Acronyms

AAC .....	Alaska Administrative Code
ADEC .....	Alaska Department of Environmental Conservation
AS .....	Alaska Statutes
ASTM .....	American Society of Testing and Materials
CEMS .....	Continuous Emission Monitoring System
C.F.R. ....	Code of Federal Regulations
COMS .....	Continuous Opacity Monitoring System
DLE .....	Dry Low Emissions
EPA .....	Environmental Protection Agency
HHV .....	Higher heating value
mr&r .....	Monitoring, recordkeeping, and reporting
MACT .....	Maximum Achievable Control Technology
NA .....	Not Applicable
NAICS .....	North American Industry Classification System
NESHAPS .....	National Emission Standards for Hazardous Air Pollutants
NSPS .....	New Source Performance Standards
PS .....	Performance specification
PSD .....	Prevention of Significant Deterioration
RM .....	Reference Method
SIC .....	Standard Industrial Classification
SN .....	Serial Number
TBD .....	To Be Determined

## Units and Measures

bhp .....	brake horsepower or boiler horsepower <sup>1</sup>
gr./dscf .....	grains per dry standard cubic feet (1 pound = 7,000 grains)
dscf .....	dry standard cubic foot
gph .....	gallons per hour
kW .....	kiloWatts
kW-e .....	kiloWatts electric <sup>2</sup>
mmBtu .....	million British Thermal Units
ppm .....	parts per million
ppmv .....	parts per million by volume
tph .....	tons per hour
tpy .....	tons per year
wt% .....	weight percent

## Pollutants

CO .....	Carbon Monoxide
HAPS .....	Hazardous Air Pollutants
H <sub>2</sub> S .....	Hydrogen Sulfide
NO <sub>x</sub> .....	Oxides of Nitrogen
NO <sub>2</sub> .....	Nitrogen Dioxide
NO .....	Nitric Oxide
PM-10 .....	Particulate Matter with an aerodynamic diameter less than 10 microns
SO <sub>2</sub> .....	Sulfur Dioxide
VOC .....	Volatile Organic Compound

<sup>1</sup> For boilers: One boiler horsepower = 33,472 Btu-fuel per horsepower-hour divided by the boiler's efficiency.  
For engines: approximately 7,000 Btu-fuel per brake horsepower-hour is required for an average diesel internal combustion engine.

<sup>2</sup> kW-e refers to rated generator electrical output rather than engine output

## Section 1 Permit Terms and Conditions

### Emission Unit Inventory and Description

1. **Authorization.** The Permittee may install Emission Units 18 through 23 described in Table 1, or alternative units as described in condition 1.1, at this stationary source in accordance with the terms and conditions of this permit and the original construction permit application and subsequent submittals listed in Section 2. The Permittee shall configure Emission Units 18 and 19 with Dry Low Emissions (DLE) Technology.

**Table 1 - Construction Permit Emission Unit Inventory<sup>a</sup>**

No.	Type	Make/Model	Fuel	Rating/Size
18	Combustion Turbine Generator with DLE	Siemens Cyclone	Natural Gas	12.9 MW
19	Combustion Turbine Generator DLE	Siemens Cyclone	Natural Gas/ Diesel	12.9 MW
20	Reciprocating Internal Combustion Engine	Caterpillar 3516B	Diesel	2,250 kW
21	Reciprocating Internal Combustion Engine	To Be Determined (TBD)	Diesel	65 kW-e
22	Boiler	TBD	Diesel	5 mmBtu/hr
23	Boiler	TBD	Diesel	5 mmBtu/hr

Table Notes:

<sup>a</sup> Except as noted elsewhere in this permit, the information in this table is for identification purposes only.

- 1.1 If the Permittee elects to install an alternative to the units listed in Table 1, the alternative unit shall be of equal or lesser rating/size than the unit it is replacing in Table 1. At least 30 days before installation of the alternative unit, submit to the Department's Fairbanks office a demonstration that the maximum emission rates of NO<sub>x</sub>, CO, PM-10 and VOC for the alternative unit are equal to or less than those from the unit it is replacing.
- 1.2 At least five days before initial startup<sup>3</sup> of Emission Units 18 through 23 or alternative units, submit the following to the Department's Fairbanks office
- vendor specification sheets that identify the unit type, make and model (including model number), serial number, and rating/size; and
  - the installation date and estimated date of startup.

<sup>3</sup> *Initial startup* means when an emission unit is first fired.

- 1.3 Unless an extension is granted by the Department in writing as indicated in condition 1.4, decommission<sup>4</sup> existing Emission Units 1 through 10 and 14 through 16 listed in Table 1 of initial Operating Permit 074TVP01 within 270 calendar days after initial startup of any Emission Unit 18 through 23 or alternative unit. During the 270 day “startup period”:
- a. do not operate any of new Emission Units 18 through 23, or alternative units, concurrently with any of existing Emission Units 1 through 10 and 14 through 16 except during start-up, shut-down or system performance testing of new Emission Units 18 through 23 or alternatives units;
  - b. for any time any new Emission Unit 18 through 23 or alternative unit is operated, record the emission unit number, startup time and date, duration of operation, shutdown time and date, and whether any existing Emission Unit 1 through 10 and 14 through 16 operated concurrently; and
  - c. if an existing Emission Unit 1 through 10 and 14 through 16 operates concurrently with new Emission Units 18 through 23 or alternative unit, include the operational mode of each new Emission Unit 18 through 23 or alternative unit, with the information recorded in condition 1.3b, and if the operational mode is other than startup, shutdown, or performance test, report as a permit deviation under condition 46 of initial Operating Permit No. 074TVP01.
- 1.4 The Department may allow an extension of the “startup period” for due cause. Submit a request for an extension in writing to the Departments Fairbanks office within 240 days of initial startup of any Emission Unit 18 through 23 or alternative unit. Include a description of the reason for the extension. The Department will grant an extension of up to 30 days if the Department finds due cause exists.
- 1.5 Include with the next operating report required by condition 48 of initial Operating Permit No. 074TVP01:
- a. the actual initial startup dates for each Emission Unit 18 through 23 or alternative units;
  - b. the decommissioning dates for each Emission Unit 1 through 10 and 14 through 16; and
  - c. copies of the notifications and records required by conditions 1.1, 1.2 and 1.3b.

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<sup>4</sup> *Decommission* means the fuel systems and generator electrical leads have been disconnected

## Ambient Air Quality Protection Requirements

2. **Operational Limits (NO<sub>x</sub>, SO<sub>2</sub>).** The Permittee shall restrict 12 consecutive month total operating hours of Emission Units 19, 20 and 21 to less than the limits listed in Table 2 to protect ambient air quality.

**Table 2 – Operating Hour Limits<sup>a</sup>**

<b>Emission Unit No.</b>	<b>12-Consecutive Month Hourly Limit, in hours</b>
19	240 on diesel fuel
20	600 total
21	300 total

- 2.1 Monitor and record hours that Unit 19 operated on diesel fuel and total hours of operation for Units 20 and 21 for each month.
- 2.2 By the 15<sup>th</sup> of each month, add monthly total to previous 11 months to get 12 consecutive month total.
- 2.3 Report according to condition 46 of initial Operating Permit No, 074TVP01 if any 12 month total exceeds a limit in Table 2.
- 2.4 Include copies of records required under conditions 2.1 and 2.2 with the operating report for that period required under condition 48 of initial Operating Permit No. 074TVP01.
3. **Fuel Sulfur (SO<sub>2</sub>).** The Permittee shall comply with SO<sub>2</sub> ambient air quality standards and increments as follows.
- 3.1 Limit the hydrogen sulfide (H<sub>2</sub>S) content of fuel gas to no greater than 150 parts per million by volume (ppmv). Monitor according to condition 6.1a of initial Operating Permit No. 074TVP01, and report under condition 46 of initial Operating Permit No. 074TVP01 any time the fuel gas H<sub>2</sub>S content exceeds 150 ppmv.
- 3.2 Limit the diesel fuel sulfur content to no greater than 0.20 percent by weight. Monitor according to condition 6.2a of initial Operating Permit No. 074TVP01, and report under condition 46 of initial Operating Permit No. 074TVP01 any time the diesel fuel sulfur content exceeds 0.2 percent by weight.

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Owner Requested Limits to Avoid Project Classification as a PSD Major Modification

**4. Carbon Monoxide (CO) Limit.** The Permittee shall

- a. comply with operating hour limits listed in Table 2, and
- b. shall limit the emissions of CO from Emission Units 18 and 19 to no more than 1,050.6 tons in any 12 consecutive months; and
- c. ensure the monthly average intake temperature for Emission units 18 and 19 is above minus 20 degrees Fahrenheit.

**4.2 Monitor and record monthly, for fuel gas and diesel fuel, for Units 18 and 19 separately**

- a. the average turbine intake temperature in degrees Fahrenheit;
- b. the average percent load (adjusted to reflect change in maximum percent load at different temperatures); and
- c. using an hour totalizer accurate to within two percent
  - (i) total hours of operation; and
  - (ii) hours of operation at:
    - (A) greater than 60 percent load (Tier 1);
    - (B) between 50 and 60 percent load (Tier 2); and
    - (C) less than 50 percent load (Tier 3).
- d. Limit Tier 2 and Tier 3 operating hours as follows:
  - (i) Tier 3 hours shall not exceed 2,160 hours per 12 consecutive month period; and
  - (ii) Tier 2 hours shall not exceed the value  $X$  shown in Equation 1.

**Equation 1**  $Y = 9,713 - 3.7738X$

Where:

$X$  = number of hours in Tier 3 per 12 consecutive month period  
 $Y$  = number of hours in Tier 2 per 12 consecutive month period

- 4.3 By the 15<sup>th</sup> of each month, calculate and record the monthly and 12 consecutive month total CO emissions for Emission Units 18 and 19 as follows:
- a. Calculate monthly average emission rate in lb per mmBtu using Method 19, assuming 15 percent oxygen, and an F factor of 9,652 dscf per mmBtu for fuel gas and 9,884 for diesel fuel , as shown in Equation 2 and Equation 3, respectively.

**Equation 2**       $E = C_d (34,191)$       **for fuel gas**

**Equation 3**       $E = C_d (35,012)$       **for diesel fuel**

Where:

E = CO emission rate in lb per mmBtu  
Cd = CO volume concentration in lb per scf. Before the source test required under condition 5, use the values in ppmvd from Table 3 and Table 4 and convert to lb per scf.<sup>5</sup> After the source test use the values in ppmvd developed as indicated in condition 5.5, and convert to lb per scf.

**Table 3 - CO Emission Rates for Emission Units 18 and 19 Burning Natural Gas (ppmvd)<sup>6</sup>**

Monthly Average Load (Percent)	Monthly Average Inlet Temperature, degrees Fahrenheit										
	Greater than or equal to 60	Between 59 and 41	40	Between 39 and 21	20	Between 19 and 1	0	Between minus 1 and minus 9	Minus 10	Between minus 9 and minus 19	Less than or equal to minus 20
<b>100</b>	10	10	10	10	10	10	10	10	10	10	10
<b>99 - 76</b>	10	10	10	10	10	25	25	25	25	25	25
<b>75</b>	10	10	10	10	10	25	25	25	25	25	25
<b>74 - 50</b>	50	50	50	50	50	500	500	1000	1000	1,250	1,250
<b>30 - 49</b>	1,250	1,500	1,500	2,000	2,000	3,000	3,000	3,000	3,000	3,800	3,800
<b>Less or equal to 29</b>	2,000	2,500	2,500	3,000	3,000	4,000	4,000	4,000	4,000	4,500	4,500

<sup>5</sup> Multiply ppmvd by 7.267 e-8 to get lb per scf

<sup>6</sup> Emission rates in ppmvd from vendor data included in Appendix B of the permit application dated September 2004.



**Table 4 - CO Emission Rates for Emission Unit 19 Burning Diesel (ppmvd)<sup>7</sup>**

Monthly Average Load (Percent)	Monthly Average Inlet Temperature, degrees Fahrenheit										
	Greater than or equal to 60	Between 59 and 41	40	Between 39 and 21	20	Between 19 and 1	0	Between minus 1 and minus 9	-10	Between minus 9 and minus 19	Less than or equal to minus 20
Greater than or equal to 75	50	50	50	50	50	50	50	50	50	50	50
74 - 50	50	50	50	50	50	50	50	50	50	2,150	2,150
30 - 49	1,000	1,200	1,200	1,200	1,200	2,500	2,500	3,000	3,000	3,500	3,500
Less or equal to 29	1,200	2,500	2,500	3,000	3,000	3,500	3,500	4,000	4,000	4,000	4,000

- b. Calculate monthly emission for each Emission Unit 18 and 19 in tons using the emission rate in lb per mmBtu from condition 4.3a, mmBtu per hour based on monthly average temperature, and monthly operating hours.
  - c. Calculate 12 consecutive month total CO emissions from both Emission Units 18 and 19.
  - d. After department approval of the source tests for burning fuel gas conducted in accordance with condition 5, use the source test emission rates developed under condition 5.5 retroactive to the dates of the source tests, rather than the emission rates in Table 3.
- 4.4 Report as excess emissions under condition 46 of initial Operating Permit 074TVP01 if the 12 consecutive month total CO emissions calculated under condition 4.3c exceed the limit in this condition.
  - 4.5 Report under condition 48 of initial Operating Permit No. 074TVP01 the monthly and 12 consecutive month total CO emissions for Emission Units 18 and 19.

<sup>7</sup> Emission rates in ppmvd from vendor data included in Appendix B of the permit application dated September 2004.

- 5. CO Emissions Source Tests.** Within 365 days of startup of the first of Emission Unit 18 or 19, the Permittee shall conduct one summer time (June through August) and one winter time (December through February) CO and oxygen source test burning natural gas fuel in accordance with Section 9 of initial Operating Permit No. 074TVP01 and as follows:
- 5.1 Test either Emission Unit 18 or 19, at no less than three loads (high, medium, and low) within the normal operating range of the unit.
  - 5.2 During each run, monitor and record the unit's electric load, inlet temperature, and fuel consumption no less than once every 15 minutes.
  - 5.3 Obtain for the fuel used during the testing, the fuel specific lower heating value (net heat value) or analyze a representative sample of the fuel in accordance with ASTM D 3588.
  - 5.4 For each load range, determine the load specific CO emission factor using exhaust properties determined by both Method 19 and exhaust gas measurements as set out in Section 9 of initial Operating Permit No. 074TVP01.
  - 5.5 If the emission rates from condition 5.4 exceed the emission rates for natural gas in Table 3 for a given load and temperature range, develop a new table for the loads and temperatures in Table 3. For the loads and temperatures that were not tested, increase the emission factors by the highest percent increase during that test using lineal interpolation.
  - 5.6 Submit information collected in conditions 5.1 through 5.5 in each source test report as required by condition 38 of initial Operating Permit No. 074TVP01.
- 6. Limits to Prevent Project Classification as a PSD Major Modification for NO<sub>x</sub>.** The Permittee shall comply with operating hour limits for Units 19, 20 and 21 listed in Table 2. Calculate and record the 12 consecutive month total operating hours for Emission Unit 19 burning diesel using data obtained in condition 4.2.
- 7. Limits to Prevent Project Classification as a PSD Major Modification for SO<sub>2</sub>.** The Permittee shall comply with operating hour limits for Units 19, 20 and 21 listed in Table 2, and fuel sulfur limits in condition 3.

#### Title V Permit Administrative Revisions

- 8.** Remove Condition 16 from initial Operating Permit 074TVP01 and replace with the following Condition 16; this removes the duplicative fuel limits for these emission units.
- (16.) *The Permittee shall not allow the operating time for Emission Units 11 and 12 to exceed 1,000 hours for any consecutive 12-month period on liquid fuel, combined total.*
- 16.1 *Keep monthly records of the operating hours.*

- 16.2 *Report in the stationary source operating report required by Condition 48 the combined total hours of operation on liquid fuel for Emission Units 11 and 12 for the previous consecutive 12-month period.*
- 16.3 *Report under Condition 46 any exceedance of the hourly limit in Condition 16.*
9. Remove Condition 17 from Operating Permit 074TVP01 and replace with the following Condition 17; this removes the duplicative fuel limit for this emission unit.
- (17.) *The Permittee shall not allow the operating time for Emission Unit 13 to exceed 500 hours for any consecutive 12-month period on liquid fuel.*
- 17.1 *Keep monthly records of the operating hours.*
- 17.2 *Report in the stationary source operating report required by Condition 48 the total hours of operation on liquid fuel for Emission Unit 13 for the previous consecutive 12-month period.*
- 17.3 *Report under condition 46 any exceedance of the hourly limit in Condition 17.*

Federal Emissions Standards - Siemens Cyclone Emission Units 18 and 19.

10. **NSPS Subpart A Good Air Pollution Practice.** The Permittee shall comply with 40 C.F.R. 60.11(d) for Emission Units 18 and 19.
11. **NSPS Subpart A Notification and Recordkeeping.** The Permittee shall comply with 40 C.F.R. 60.7(a)(1), 40 C.F.R. 60.7(a)(3), (a)(4), (a)(6) for Emission Units 18 and 19.
12. **NSPS Subpart A Startup, Shutdown, & Malfunction Requirements.** The Permittee shall comply with 40 C.F.R. 60.7(b) for Emission Units 18 and 19.
13. **NSPS Subpart A Performance Tests.** The Permittee shall comply with 40 C.F.R. 60.8(a) through (f) for Emission Units 18 and 19.
14. **NSPS Subpart A Circumvention.** The Permittee shall comply with 40 C.F.R. 60.12 for Emission Units 18 and 19.
15. **40 C.F.R. 60, Subpart GG, Stationary Gas Turbines.**
- 15.1 The Permittee shall ensure that Emission Units 18 and 19 comply with
- the NO<sub>x</sub> emission limit in 40 C.F.R. 60.332(a)(2) except as provided in 40 C.F.R. 60.331(r); and
  - the SO<sub>2</sub> limits listed in 40 C.F.R. 60.333(a) or (b).

15.2 Except as provided for in an U.S. EPA waiver or custom monitoring schedule, the Permittee shall comply with 40 C.F.R. 60.334(f) to monitor and record the sulfur content and nitrogen content of the fuel gas or liquid fuel.

15.3 The Permittee shall:

- a. conduct performance tests as required in 40 C.F.R. 60.335(a) and (b), or alternative test methods in accordance with 40 C.F.R. 60.335(c);
- b. determine compliance with the sulfur content standard using methodology described in 40 C.F.R. 60.335(b)(10), except as provided for in an EPA alternative monitoring plan; and
- c. the Permittee may propose an alternative to the reference methods in accordance with 40 C.F.R. 60.335(c)(1). Provide a copy of EPA issued custom monitoring plan to the Department upon request.

## State Emission Standards

**16. Visible Emissions.** The Permittee shall not cause or allow visible emissions, excluding condensed water vapor, emitted from any Emission Unit 18 through 23 to reduce visibility through the exhaust effluent by any of the following:

- a. more than 20 percent for a total of more than three minutes in any one hour;
- b. more than 20 percent averaged over any six consecutive minutes.

16.1 For Emission Unit 18 (gas-fired unit), verify compliance with the visible emission standard by certifying annually in accordance with condition 49 of initial Operating Permit No. 074TVP01 whether the unit burned only natural gas fuel. Report as a permit deviation under condition 46 of initial Operating Permit No. 074TVP01 if any other fuel was burned in the unit.

16.2 For each Emission Units 19 through 23 (dual and liquid fuel fired units) listed in Table 1, comply as follows while using liquid fuel.

- a. Verify initial compliance with the visible emission standard using either condition 16.2a(i) or 16.2a(ii).
  - (i) Prior to unit installation, obtain a certified manufacturer guarantee that each emission unit will comply with the visible emission standard and attach a copy of the guarantee to the next operating report required under condition 48 of initial Operating Permit No. 074TVP01.

- (ii) Conduct a visible emission observation in accordance with Section 9 of initial Operating Permit No. 074TVP01 within 90 days after first fired on liquid fuel. Attach a copy of the Method 9 surveillance records to the next operating report required condition 48 of initial Operating Permit No. 074TVP01.
  - b. For each unit that operates more than 400 hours per calendar year on liquid fuel, monitor, record, and report according to Section 13 of initial Operating Permit No. 074TVP01.
- 17. Particulate Matter (PM).** The Permittee shall not cause or allow PM emission from any Emission Unit 18 through 23 to exceed 0.05 grains per dry standard cubic foot (gr/dscf) of exhaust gas corrected to standard conditions and averaged over three hours.
  - 17.1 For Emission Unit 18, the Permittee shall comply with condition 16.1.
  - 17.2 For Emission Units 19 through 23, the Permittee shall comply with monitoring, recordkeeping and reporting for liquid fuel-fired equipment in initial Operating Permit No. 074TVP01, condition 5 and Section 13, "Visible Emissions and Particulate Matter Monitoring Plan."
- 18. Sulfur Compound Emissions.** The Permittee shall not cause or allow sulfur compound emission, expressed as SO<sub>2</sub>, from any Emission Unit 18 through 23 to exceed 500 ppm averaged over three hours. Monitor, record and report as required by condition 6 of initial Operating Permit No. 074TVP01.

## ***Section 2 Permit Documentation***

- September 8, 2004 Letter from Gregory T. Jones, Alyeska Pipeline Service Company, to Jim Baumgartner, ADEC, with an application for an Air Quality Control Construction Permit.
- November 15, 2004 Letter from Gregory T. Jones to Jeanette Brena, with a construction permit application revision.
- November 26, 2004 Email from Jeff Alger to Sally A. Ryan. Application supplement. (not certified as true, accurate, and complete)